



DEPARTMENT OF
ECOLOGY
State of Washington

IAA No. C180060

INTERAGENCY AGREEMENT (IAA)

BETWEEN

THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY

AND

THE CITY OF OLYMPIA

THIS INTERAGENCY AGREEMENT ("Agreement" or "IAA") is made and entered into by and between the state of Washington, Department of Ecology, hereinafter referred to as "ECOLOGY," and the CITY OF OLYMPIA hereinafter referred to as the "CITY," pursuant to the authority granted by Chapter 39.34 RCW.

THE PURPOSE OF THIS AGREEMENT is to conduct a hydrologic performance effectiveness study at bioretention facilities designed under the 2012/14 Stormwater Management Manual for Western Washington (SWMMWW). This study is the second phase of an earlier effort and will continue to provide National Pollutant Discharge Elimination System (NPDES) permittees with regional information as part of the Stormwater Action Monitoring (SAM) program to help improve their understanding of bioretention to infiltrate stormwater runoff.

WHEREAS, ECOLOGY has legal authority (RCW 90.48 and WAC 173-220) and the CITY has legal authority (RCW 35A.11.010, RCW 35A.11.040, RCW 39.34.080 and WAC Chapter 173.220) that allows each party to undertake the actions in this agreement.

WHEREAS, the CITY will use protocols developed and borrow equipment purchased by the City of Bellingham as part of earlier bioretention hydrologic survey work in 2016/2017 (C1500140) will be used for this project but are the property of City of Bellingham.

THEREFORE, IT IS MUTUALLY AGREED THAT:

1) SCOPE OF WORK

The CITY shall furnish the necessary personnel, equipment, material and/or service(s) and otherwise do all things necessary for or incidental to the performance of the work set forth in Appendix A, Statement of Work and Budget, attached hereto and incorporated herein.

2) PERIOD OF PERFORMANCE

The period of performance of this IAA shall commence on **September 15, 2017**, (or the date of final signature, whichever comes later,) and be completed by **December 31, 2019**, unless terminated sooner as provided herein. Amendments extending the period of performance, if any, shall be at the sole discretion of ECOLOGY.

3) COMPENSATION

Compensation for the work provided in accordance with this IAA has been established under the terms of RCW 39.34.130 and RCW 39.26.180(3). This is a performance-based agreement, in which payment is based on the successful completion of expected deliverables.

The source of funds for this IAA is **General Fund/ Private-Local account for Stormwater Action Monitoring**.

The parties have determined that the cost of accomplishing the work identified herein will not exceed \$526,026.00, including any indirect charges. Payment for satisfactory performance of the work shall not exceed this amount unless the parties mutually agree via an amendment to a higher amount. Compensation for services shall be based on the terms and tasks set forth in Appendix A, Statement of Work and Budget. ECOLOGY will not make payment until it has reviewed and accepted the completed work.

4) BILLING AND PAYMENT PROCEDURE

Payment requests shall be submitted on state form, Invoice Voucher A19-1A. Invoices shall describe and document to ECOLOGY's satisfaction a description of the work performed, the progress of the work, and related costs. Each invoice voucher shall reference the Agreement (IAA) number and clearly identify those items that relate to performance under this Agreement. Payment will be made within thirty (30) days of submission of a properly completed invoice (form A19-1A) with supportive documentation. All expenses invoiced shall be supported with copies of invoices paid.

Send invoices to:

**State of Washington
Department of Ecology
Attn: Brandi Lubliner
P.O. Box 47600
Olympia, WA 98504-7600**

Payment requests may be submitted on a quarterly basis or at the completion of the work and acceptance of the deliverables listed in Appendix A. Upon expiration of this Agreement, any claim for payment not already made shall be submitted to ECOLOGY within 30 days after the expiration date or the end of the fiscal year, whichever is earlier.

Payment will be issued through Washington State's Department of Enterprise Services Statewide Payee Desk. To receive payment you must be registered as a state-wide vendor. To register submit a state-wide vendor registration form and an IRS W-9 form at website, <http://www.des.wa.gov/services/ContractingPurchasing/Business/VendorPay/Pages/default.aspx>. If you have questions about the vendor registration process you can contact DES at the Payee Help Desk at (360) 407-8180 or email payeehelpdesk@watech.wa.gov.

5) ALTERATIONS AND AMENDMENTS

This Agreement may be amended by mutual agreement of the parties. Such amendments shall not be binding unless they are in writing and signed by personnel authorized to bind each of the parties.

6) ASSIGNMENT

The work to be provided under this Agreement, and any claim arising thereunder, is not assignable or delegable by either party in whole or in part, without the express prior written consent of the other party, which consent shall not be unreasonably withheld.

7) ASSURANCES

Parties to this Agreement agree that all activity pursuant to this agreement will be in accordance with all the applicable current federal, state, and local laws, rules, and regulations.

8) CONFORMANCE

If any provision of this Agreement violates any statute or rule of law of the state of Washington, it is considered modified to conform to that statute or rule of law.

9) DISPUTES

Parties to this Agreement shall employ every effort to resolve a dispute themselves without resorting to litigation. In the event that a dispute arises under this Agreement that cannot be resolved among the parties, it shall be determined by a Dispute Board in the following manner. Each party to this Agreement shall appoint one member to the Dispute Board. The members so appointed shall jointly appoint an additional member to the Dispute Board. The Dispute Board shall review the facts, agreement terms, and applicable statutes and rules, and then make a determination of the dispute. The determination of the Dispute Board shall be final and binding on the parties hereto, unless restricted by law. The cost of resolution will be borne by each party paying its own cost. As an alternative to this process, if state agencies, either of the parties may request intervention by the Governor, as provided by RCW 43.17.330, in which event the Governor's process will control. The parties may mutually agree to a different dispute resolution process.

10) FUNDING AVAILABILITY

ECOLOGY's ability to make payments is contingent on availability of funding. In the event funding from state, federal, or other sources is withdrawn, reduced, or limited in any way after the effective date and prior to completion or expiration date of this Agreement, ECOLOGY, at its sole discretion, may elect to terminate the Agreement, in whole or part, for convenience or to renegotiate the Agreement subject to new funding limitations and conditions. ECOLOGY may also elect to suspend performance of the Agreement until ECOLOGY determines the funding insufficiency is resolved. ECOLOGY may exercise any of these options with no notification restrictions, although ECOLOGY will make a reasonable attempt to provide notice.

In the event of termination or suspension, ECOLOGY will reimburse eligible costs incurred by the CONTRACTOR through the effective date of termination or suspension. Reimbursed costs must be agreed to by ECOLOGY and the CONTRACTOR. In no event shall ECOLOGY's reimbursement exceed ECOLOGY's total responsibility under the agreement and any amendments.

11) GOVERNING LAW AND VENUE

This Agreement is entered into pursuant to and under the authority granted by the laws of the state of Washington and any applicable federal laws. The provisions of this Agreement shall be construed to conform to those laws. This Agreement shall be construed and interpreted in accordance with the laws of the state of Washington, and the venue of any action brought hereunder shall be in the Superior Court for Thurston County.

12) INDEPENDENT CAPACITY

The employees or agents of each party who are engaged in the performance of this Agreement shall continue to be employees or agents of that party and shall not be considered for any purpose to be employees or agents of the other party.

13) ORDER OF PRECEDENCE

In the event of an inconsistency in the terms of this Agreement, or between its terms and any applicable statute or rule, the inconsistency shall be resolved by giving precedence in the following order:

- a. Applicable federal and state of Washington statutes, regulations, and rules.
- b. Mutually agreed upon written amendments to this Agreement.
- c. This Agreement, number C1800060.
- d. Appendix A, Statement of Work and Budget.
 - Any other provisions or term of this Agreement, including materials incorporated by reference or otherwise incorporated.

14) RECORDS MAINTENANCE

The parties to this Agreement shall each maintain books, records, documents and other evidence that sufficiently and properly reflect all direct and indirect costs expended by either party in the performance of the service(s) described herein. These records shall be subject to inspection, review or audit by personnel of both parties, other personnel duly authorized by either party, the Office of the State Auditor, and federal officials so authorized by law. All books, records, documents, and other material relevant to this Agreement will be retained for six years after expiration of this Agreement and the Office of the State Auditor, federal auditors, and any persons duly authorized by the parties shall have full access and the right to examine any of these materials during this period.

Records and other documents, in any medium, furnished by one party to this Agreement to the other party, will remain the property of the furnishing party, unless otherwise agreed. The receiving party will not disclose or make available this material to any third parties without first giving notice to the furnishing party and giving it a reasonable opportunity to respond. Each party will utilize reasonable security procedures and protections to assure that records and documents provided by the other party are not erroneously disclosed to third parties subject to state public disclosure laws.

15) RESPONSIBILITIES OF THE PARTIES

Each party of this Agreement hereby assumes responsibility for claims and/or damages to persons and/or property resulting from any act or omissions on the part of itself, its employees, its officers, and its agents. Neither party will be considered the agent of the other party to this Agreement.

16) RIGHTS IN DATA

Unless otherwise provided, data which originates from this Agreement shall be "work made for hire" as defined by the United States Copyright Act, Title 17 U.S.C. section 101 and shall be owned by state of Washington, ECOLOGY. Data shall include, but not be limited to, reports, documents, pamphlets, advertisements, books magazines, surveys, studies, computer programs, films, tapes, and/or sound reproductions. Ownership includes the right to copyright, patent, register, and the ability to transfer these rights.

17) SEVERABILITY

If any provision of this Agreement or any provision of any document incorporated by reference shall be held invalid, such invalidity shall not affect the other provisions of this Agreement which can be given effect without the invalid provision, if such remainder conforms to the requirements of applicable law and the fundamental purpose of this Agreement, and to this end the provisions of this Agreement are declared to be severable.

18) SUBCONTRACTORS

The CITY agrees to take complete responsibility for all actions of any Subcontractor used under this Agreement for the performance. When federal funding is involved there will be additional subcontractor requirements and reporting.

Prior to performance, all subcontractor who will be performing services under this Agreement must be identified, including their name, the nature of services to be performed, address, telephone, WA State Department of Revenue Registration Tax number (UBI), federal tax identification number (TIN), and anticipated dollar value of each subcontract. Provide such information to ECOLOGY's agreement manager.

19) TERMINATION FOR CAUSE

If for any cause, either party does not fulfill in a timely and proper manner its obligations under this Agreement, or if either party violates any of these terms and conditions, the aggrieved party will give the other party written notice of such failure or violation. The responsible party will be given the opportunity to correct the violation or failure within fifteen (15) business days. If failure or violation is not corrected, this Agreement may be terminated immediately by written notice of the aggrieved party to the other.

20) TERMINATION FOR CONVENIENCE

Either party may terminate this Agreement without cause upon thirty (30) calendar day prior written notification to the other party. If this Agreement is so terminated, the parties shall be liable only for performance rendered or costs incurred in accordance with the terms of this Agreement prior to the effective date of termination.

21) WAIVER

A failure by either party to exercise its rights under this Agreement shall not preclude that party from subsequent exercise of such rights and shall not constitute a waiver of any other rights under this Agreement unless stated to be such in a written amendment to this Agreement signed by an authorized representative of the parties.

22) AGREEMENT MANAGEMENT

The representative for each of the parties shall be responsible for and shall be the contact person for all communications, notifications, and billings questions regarding the performance of this Agreement. The parties agree that if there is a change in representatives that they will promptly notify the other party in writing of such change, such changes do not need an amendment.

The ECOLOGY Representative is:	The OLYMPIA Representative is:
Name: Brandi Lubliner, P.E. Address: 300 Desmond Dr. SE (USPS) P.O. Box 47600 (FedEx) Olympia, WA 98504-7600 Phone: 360-407-7140 Email: Brandi.Lubliner@ecy.wa.gov	Name: Andy Haub, P.E. Address: P.O. Box 1967 Olympia, WA 98507 Phone: (360) 570-3795 Email: ahaub@ci.olympia.wa.us Fax: (360) 709-2797

23) ALL WRITINGS CONTAINED HEREIN

This Agreement contains all the terms and conditions agreed upon by the parties. No other understandings, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind any of the parties hereto.

The signatories to this Agreement represent that they have the authority to bind their respective organizations to this Agreement.

IN WITNESS WHEREOF, the parties below, having read this Agreement in its entirety, including all attachments, do agree in each and every particular as indicated by their below signatures.

**State of Washington
Department of Ecology**

City of Olympia

By: Polly Zehm by Carol A. [Signature] 10-11-17
Signature Date

By: [Signature] 10.3.2017
Signature Date

Print Name: Polly Zehm

Print Name: Steven R. Hall

Title: Deputy Director

Title: City Manager

Approved as to form only:
Office of Attorney General

Approved as to form:
[Signature]
City Attorney

APPENDIX A STATEMENT OF WORK AND BUDGET

Bioretention Hydrologic Performance (BHP) Study II - Monitoring Facilities Designed Using the 2012 SWM Manual

A. Project Purpose

Collect hydrologic, geotechnical, and vegetation data at select bioretention facilities, and compare the actual data with original model outcomes to identify possible reasons for any differences. With the differences identified in this comparison, and geotechnical and vegetation data collected for each site, recommendations for future bioretention design will be provided for the benefit of design engineers and jurisdictional planning review staff for more predictable results.

The Bioretention Hydrologic Performance Study II (BHP Study II) project is a continuation of the current BHP Study (Phase I) already underway for the SAM program. BHP Study II will follow the same approach but will monitor bioretention facilities designed under the 2012/14 Manual. The Phase I study successfully communicated with numerous jurisdictions throughout the Puget Sound (over 20), the design engineering community (multiple firms for suggested public sector projects), and Ecology (Water Quality Grant-funded projects) to identify and assess potential sites, and select sites. The BHP phase I project purchased in fall 2016 and used \$65,000 in monitoring equipment, which will be re-used for this BHP Study II. Relatively little new equipment will be needed.

The experience of outreach, site assessment, and monitoring gained in the first phase of the BHP study in Phase I will greatly inform and support a similar, larger effort for Phase II to again generate broad regional value. The Phase II effort will have the benefit of further outreach and participation of multiple smaller jurisdictions (who want to participate in the SAM-funded monitoring), and will establish insight into the extent of implementation of bioretention under the 2012/14 manual. Results from this BHP Study II will be compared to results from phase I to provide adaptive feedback to the 2012 SWMMWW (manual) design process and, most importantly, to the jurisdictions themselves. The results are proposed to be communicated to local jurisdictions through multiple, county-based presentations, and to Ecology and the Stormwater Work Group.

Regarding application to the SWMMWW, the BHP Phase II project will indicate whether projects are meeting performance expectations for MR #5 through MR #7, and provide feedback to Volume III, Section 3.4 Stormwater-related Site Procedures and Design Guidance for Bioretention and Permeable Pavement. The BHP Study II project will demonstrate the ability of the bioretention soil-water algorithms in Western Washington Hydrology Model (WWHM) 2012 to accurately model the movement of stormwater through the bioretention soil mix specified by the 2012 manual. Implementation of bioretention in Washington state is expected to increase rapidly using the current manual design standards, making this assessment all the more important and timely to local stormwater programs.

In these ways the BHP Study II applies directly to implementation of NPDES stormwater permit programs; benefits multiple permittees; is of regional significance; and will provide long term benefits through updates to the SWMMWW and the associated bioretention design assumptions in the WWHM. This project is also a good candidate to share site sampling with other effectiveness study proposals.

B. Project Description and Objectives

The project objectives are two-fold: a) provide outreach, sampling, and communication of results to a broad base of NPDES jurisdictions, and b) conduct the hydrologic, geotechnical, and vegetation data collection to analyze the performance of bioretention facilities built with adherence to the 2012, revised in 2014, version of the SWMMWW.

a) We found NPDES jurisdictions contacted during the first phase of the BHP study were enthusiastic to participate, and desired information on the performance of bioretention. In addition to the interest shown by many jurisdictions, four of the final seven participating jurisdictions offered their staff's support to help maintain and download the field monitoring equipment. As part of this next phase, BHP Study II, more jurisdictions will be contacted to participate in the study and therefore extend the regional application of the results. Participation of multiple jurisdictions furthers the goals of SAM to generate findings relevant to stormwater permittees, and long-term support for the program through broad-based inclusion. Communication of the findings will be conducted through county-based presentations for the benefit of both county and city permittee audiences.

b) The technical project objective is to compare actual hydrologic performance of constructed bioretention facilities with the expected modeled performance from the original site engineering design. Modeled results using original design data will be compared with field results based on actual rainfall during the site monitoring. Using this comparison, and drawing from additional site data such as local surficial geology, infiltration rates, groundwater fluctuation, actual constructed site conditions, and vegetation density and health, working hypotheses will be proposed for factors leading to the performance observed. Use of both the previously purchased equipment and the field data collection experience acquired during the first phase will greatly benefit this monitoring effort. The QAPP will be revised to become the BHP Study II QAPP, the anticipated changes are descriptions of the sites. There are fundamental reasons for assuring the accurate performance of bioretention facilities. If the protection of receiving water habitat is based on instream hydrologic goals in a basin utilizing Low Impact Development (LID), the performance of the individual facilities must meet their expected performance to ensure success of the combined hydrologic response of all the facilities at the sub-basin scale. As a practical issue, accurately sizing bioretention facilities will allow effective and efficient use of space, especially in retrofit applications where space may be limited by existing structures.

Overall, accurate hydrologic performance of bioretention facilities must first be met before other related performance goals (protection of downstream receiving waters, pollutant removal) can be fully realized. This research will lead to not only feedback on the SWMMWW bioretention

design for more dependable performance, but will also suggest maintenance recommendations for jurisdictions to help maintain the hydrologic performance of their facilities.

c) The “level of sophistication” for deliverables from the modeling exercise will involve comparison of storm event flow durations and other hydrologic metrics (e.g; peak flows and the percent of water filtered by the bioretention soil mix) between the modeled and observed results. Note that the flow duration lower thresholds (8% of the 2-year flow for MR #5 and 50% of the 2-year flow for MR #7) will be recalculated based on the predevelopment drainage area and soil type. The inclusion of the flow duration requirements for flows between 8% of the 2-year flow and 50% of the 2-year flow is a new 2012 manual requirement added to MR #5 and can play a major role in the sizing of bioretention facilities and their outlet control structures.

The apparent effect of model parameters (e.g. difference in actual infiltration rate) or physical construction of the facility (e.g. outflow elevations, contributing area) will be identified and discussed. This will lead to awareness of the accuracy of parameter values in design, and confirmation of construction elements.

It is unclear how many facilities have been constructed following the 2012 Manual, but discovering the extent of these facilities will be a valuable outcome of this proposal. Many candidate bioretention cells (approximately 70) came forward and were viewed in the field during the first selection process. While few were built under the 2012 manual, and none selected, more projects will have become vested and constructed during the recent improved construction environment. The 2012 Manual will be the standard for bioretention facility design going forward, and many Phase II permittees have adopted it. It will be important to assess the performance compared to earlier designs to support their growing use.

Considerable effort will again be brought to identifying appropriate facilities. Sources for site identification will include expanded outreach to NPDES jurisdictions, school districts (an active construction sector using the SWMMWW), outreach to the hundreds of engineers trained in the model by Mr. Beyerlein, and the Ecology WQ grants data base for 2016. Some of the smaller jurisdictions’ municipal codes adopted the current version of the Ecology manual, providing potential eligible projects. We fully expect a wide range of candidate facilities from throughout the Puget Sound Basin. We also expect the outreach and communication plan to result in improved participation with the smaller jurisdictions, including a proposed 6 – county tour to present findings to the smaller jurisdictions.

Deliverables will need to be made ADA accessible following guidance from Ecology’s SAM coordinator.

Task 1 Project Management **(\$16,240, September 2017 - December, 2019)**

1. Prepare consultant contract scopes and contracting This task will involve conducting the process to procure and manage consultant services for the project.

2. Prepare quarterly progress reports. This task will involve completing reporting responsibilities to Ecology.

3. Coordinate communication with Ecology and partner jurisdictions and consultants. This task is to communicate with jurisdictions and consultants related to administration of the contract.

Deliverable 1.1: Document contracting, coordination with team, and communications via quarterly progress report by City of Olympia with consultant support.

\$16,240 Due Date: Quarterly December 2017 to December, 2019

**Task 2 Prepare Site Selection Criteria and Conduct Selection Process
(\$54,540, September - December 2017)**

1. Develop site selection criteria checklist. This task will be to update the existing site selection criteria checklist in coordination with Ecology staff, consultants, and participating jurisdiction partners.

Deliverable 2.1: Site selection criteria checklist submitted to Ecology. Target date: October 15, 2017 (\$3,000).

2. Communicate selection criteria to partners; receive and organize candidate sites; visit sites. This task will involve communicating with the individual partners submitting candidate sites; collecting and evaluating background engineering and construction data; visiting candidate sites to conduct the on-site selection checklist, scoring the complete list of candidate sites and making selections of sites to be monitored. Nominal goals are to identify up to 20 candidate sites and select up to ten sites to be monitored for five months.

Deliverable 2.2: Summary of results of site evaluation and list of final sites submitted to Ecology. Target date: December 1, 2017 (\$46,540).

3. Write report on the site selection process and results including sections on: site selection criteria, candidate sites, site visit checklist results, scoring results, and proposed list of sites to be monitored.

Deliverable 2.3: Report on the site selection process submitted to Ecology. Target date: December 31, 2017 (\$5000).

\$54,540 Due Date: December 31, 2017

**Task 3 Update Quality Assurance Project Plan (QAPP)
(\$4,600, September 2017 - November 2017)**

1. Update the QAPP used for phase I of the BHP Study for all sites and overall project analysis. The revised QAPP will follow Ecology's *Guidelines and Specifications for Preparing Quality*

Assurance Project Plans for Environmental Studies, February 2001 (Ecology Publication No. 01-03-003 and be submitted to the Department of Ecology with time for revision, comment and approval.

Deliverable 3.1: BHP Study II draft QAPP for all sites addressing monitoring methods and analysis delivered to Ecology. Target date: October, 2017 (\$3,500).

2. Respond to Ecology's and other technical reviewers' comments and finalize QAPP and Phase II scope.

Deliverable 3.2: Final QAPP delivered to Ecology. Target date: November, 2017 (\$1,100).

\$4,600 Due Date: October 2017

Task 4, Monitoring Implementation; Site Geotechnical and Vegetation Sampling, Monitoring Installation, and Downloading; Multiple Technical Memos (\$270,870, September, 2017 - August, 2018)

1. Based upon the QAPP, select and procure monitoring equipment capable of meeting the requirements of this study. Utilize existing equipment borrowed from the City of Bellingham where possible if it meets the study requirements and objectives. Equipment purchased under this contract, once no longer needed for this study belongs to the City of Olympia.

Deliverable 4.1: Proposed equipment list and approximate cost; purchase plan meeting State open bidding and procurement processes where applicable; documentation of bidding process showing the bid selection and reasoning for any deviation from use of the lowest responsible bidder; and invoice and receipt of procured equipment. Target Date: November 2017 (\$28,210 for labor, equipment, and other direct costs).

2. Based upon the QAPP, testing of the sites shall be conducted to provide the information necessary to meet the goals of this study. This includes but is not limited to:

- a) Geotechnical/soils design and current conditions, infiltration tests
- b) Review of facility hydrologic design and current conditions
- c) Sampling and analysis of vegetation design and current condition

Deliverable 4.5: Testing and memo report on geotechnical review with attached individual facility site testing reports. Target Date: July 2018 (\$80,000).

Deliverable 4.6: Review and memo report on hydrologic design review with individual reports for each facility. Target Date: July 2018 (\$20,000).

Deliverable 4.7: Sampling and memo report on vegetative investigations with individual reports for each facility. Target Date: July 2018 (\$24,000).

3. Equipment shall be installed in conformance with the QAPP to provide monitoring at up to 10 bioretention stormwater cells for up to 5 months. Monitoring of facility performance shall include:

- a) Rainfall, continuous
- b) Temperature, continuous
- c) Evapotranspiration factors, calculated
- d) Groundwater elevation, observation
- e) Water input to the facility, continuous
- f) Water output from the facility, observation or continuous – by facility

Completed Monitoring Installation: Target Date: December 2017 (\$108,660)

Deliverable 4.8: Monitoring quarterly report section: A monitoring section of the quarterly reports (Deliverable 1.1) will be included once monitoring begins to summarize the status of flow, rainfall and soil monitoring. Information provided will include the number of monitoring events and sites, relevant issues with monitoring, reasons why events were missed, and electronic spreadsheet of raw data files. Target Date: Quarterly 2017-2018. (\$10,000).

\$270,870 Due Date: March 2018

**Task 5, Data Analysis, Modeling, and Technical Memos
(\$44,280, April 2018 - November 2018)**

This task consists of maintaining, managing and utilizing data from the study to provide relevant information on the hydrologic function of bioretention facilities. Analysis of the individual facilities should be used to inform and support conclusions for the design, use, and hydrologic performance of bioretention facilities on a wide scale for Western Washington.

Deliverable 5.1: Meeting with Stormwater Work Group members, Ecology staff and City of Olympia staff to discuss results of monitoring, adequacy of data set and next steps for analysis. Target Date: June 2018 or as determined by Ecology (\$2,000).

Deliverable 5.2: Provide technical memo summarizing the development of models for each bioretention based on as-built construction, confirmed drainage area and site field conditions (depth of soil mix, groundwater, native soil infiltration, etc). The memo will also propose analysis framework and endpoints. Target Date: September 2018 or as determined by Ecology (\$10,000).

Deliverable 5.3: As-Built WWHM2012 (or agreed upon newer version) model of each bioretention facility in the study. Target Date: September 2018 (\$30,000).

Deliverable 5.4: Technical memo on the conclusions of the study for review and comments prior to creation of final report. This should include:

- Issues with existing designs or construction practices
- Recommendations for bio-retention designs and design methodologies

- Recommendations for revised construction practices
- Development of an anticipated hydrologic performance matrix based on multiple variables of design, soils, vegetation, etc. Target Date: October 2018 (\$1,000).

Deliverable 5.5: Meeting with Stormwater Work Group members, Ecology staff and City of Olympia staff to discuss Technical Memo and provide feedback prior to final reporting. Target Date: November 2018 or as determined by Ecology (\$1,280).

\$44,280 Due Date: November 2018

**Task 6, Draft and Final Report and Findings Communication
(\$87,680 November 2018 - June 2019)**

This task is the provision of a final report that provides information on the totality of the project. This task has added conducting county-based presentations for six counties and their associated cities throughout the sampling area. The final report will at a minimum contain the following:

- Design study goals
- Selections process
- A synopsis of the QAPP along with information on any necessary deviations from the proposed plan
- Study results from the monitoring with explanation of any uncharacteristic or any unexpected results
- Site information for each of the facilities with location and photo. The information should include at a minimum: design performance versus actual performance, deviations between design and construction that led to the differential
- Final recommendations from the technical memo and meetings in Task 5.

Deliverable 6.1: Electronic Draft Final Report for review and comments by Ecology, City of Olympia and Stormwater Work Group. Target Date December 2018 (\$44,000).

Deliverable 6.2: Presentation to the Stormwater Work Group. Target Date January 2019 (\$3,000).

Deliverable 6.3: Three printed copies of Final Report, one electronic version of Final Report plus all data files, reports and miscellaneous data relevant to the project. Target Date March 2019 (\$8,000).

Deliverable 6.4: Communication flyer and fact sheet for SAM Communications and website. Target Date: March 2019 (\$4,000).

Deliverable 6.5: Conduct a six-County “road show” presenting results for counties associated cities in each county. Target Date: June 2019 (\$27,670).

\$86,670 Due Date: June 2019

Total project costs are \$524,920. This includes hourly labor costs, travel, supplies, lab analysis and 10% contingency.

Item	Description	Amount
Task 1	Project management	\$ 16,240
Task 2	Prepare Site Selection Criteria and Conduct Selection Process	\$ 54,540
Task 3	Update Quality Assurance Project Plan (QAPP)	\$ 4,600
Task 4	Monitoring Implementation; Site Geotechnical and Vegetation Sampling, Monitoring Installation, and Downloading; Multiple Technical Memos	\$270,870
Task 5	Data Analysis, Modeling, and Technical Memos	\$ 44,280
Task 6	Draft and Final Report and Findings Communication	\$ 86,670
	Total Project Cost	\$477,200
	10% Contingency	\$ 47,720
	Total Project Cost w/ Contingency	\$524,920